Statistics

Lecture 33

Feb 19-8:47 AM

SG 19

Normal Prob. Dist.

1) use x, $P(x=c)=0$

2) Data dist. is symmetric and has a bell-shape curve with total area 1.

3) Mean = Mode = Median

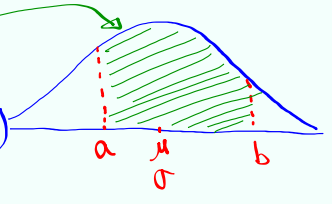
4) μ and σ are given in the Problem.

$N(\mu, \sigma)$

$P(a<x<b)$ is the area of the corresponding region within the bell-Curve

How to find it?

normalcdf(L, U, μ, σ)



Oct 24-8:52 AM

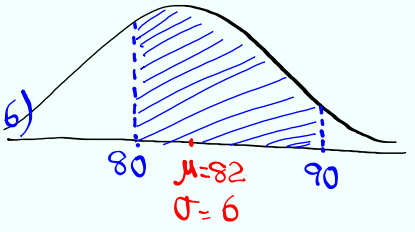
Given $N(82, 6)$

Normal Prob. Dist. — μ — σ

$P(80 < x < 90)$

= normalcdf(80, 90, 82, 6)

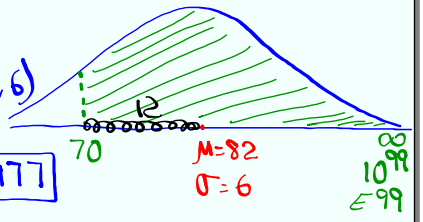
= .539



$P(x > 70)$

= normalcdf(70, E99, 82, 6)

2nd , = .977

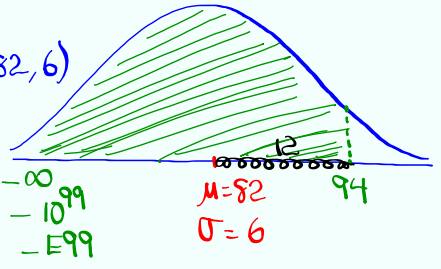


Oct 24-8:57 AM

$P(x < 94)$

= normalcdf(−E99, 94, 82, 6)

(−) 2nd , = .977



Find $x = P_{95}$

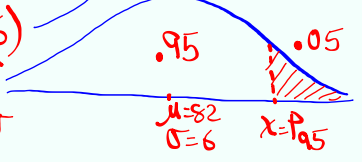
95% below — Left Area .95

5% above — Right area .05

Round to whole # → ≈ 92

x = invNorm(.95, 82, 6)

Left Area — μ — σ



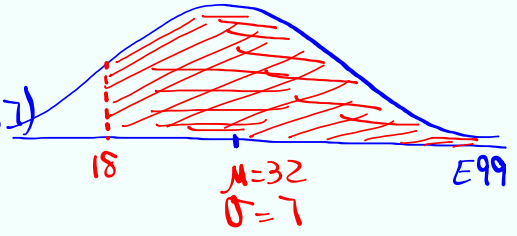
Oct 24-9:04 AM

Consider normal dist. with $\mu = 32$ and $\sigma = 7$. $N(32, 7)$

$P(x > 18)$

= normalcdf(18, E99, 32, 7)

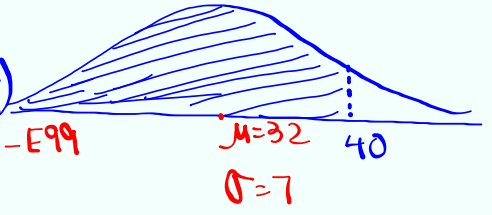
= .977



$P(x < 40)$

= normalcdf(-E99, 40, 32, 7)

= .873

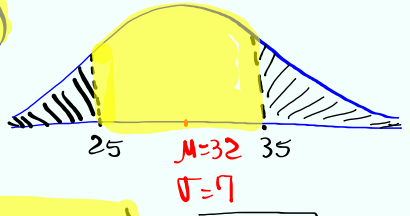


Oct 24-9:11 AM

$P(x < 25 \text{ OR } x > 35)$

$= 1 - P(25 < x < 35)$

↑ Total Prob.



$= 1 - \text{normalcdf}(25, 35, 32, 7) \approx .493$

Find a Value, rounded to whole #, that Separates the top 10% from the rest.

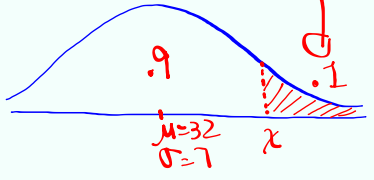
Right area .1

$x = \text{invNorm}(.9, 32, 7)$

left Area

μ σ

≈ 41



Oct 24-9:19 AM

Suppose exam scores are normally dist with the mean of 84 and standard deviation of 8. $N(84, 8)$

If we randomly select **one exam**

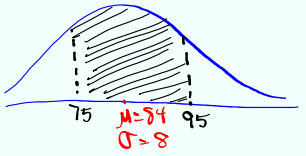
P(**Score** is between 75 and 95)

x

$P(75 < x < 95)$

= normalcdf(75, 95, 84, 8)

= .785



Find the exam Score that separates the bottom 30% from the rest. Round to whole #.

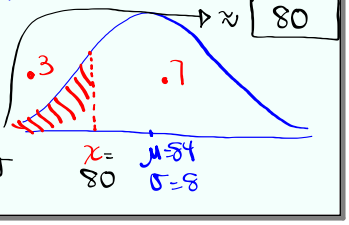
left Area .3

Left Area

x = invNorm(.3, 84, 8)

μ σ

≈ 80

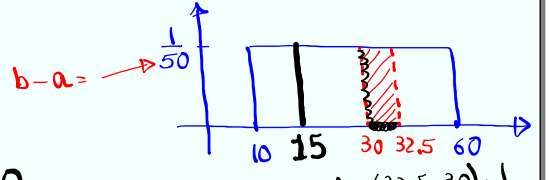


Oct 24-9:27 AM

Consider a uniform Prob. dist. for all values from 10 to 60. Rectangular graph

a b

1) Draw & clearly label.



2) $P(x = 15) = 0$

3) $P(30 < x < 32.5) = (32.5 - 30) \cdot \frac{1}{50} = \frac{2.5}{50} = \frac{1}{20}$

4) Find x-value that is the 70th Percentile.

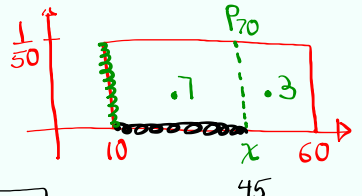
$x = P_{70}$

$(x - 10) \cdot \frac{1}{50} = .7$

$x - 10 = 50(.7)$

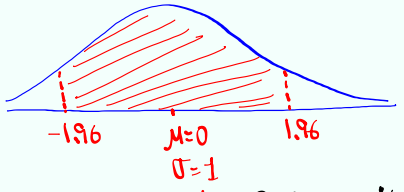
$x - 10 = 35$

$x = 45$



Oct 24-9:36 AM

Find $P(-1.96 < Z < 1.96)$



= normalcdf (−1.96, 1.96, 0, 1) = .950 ≈ 95%

(−)

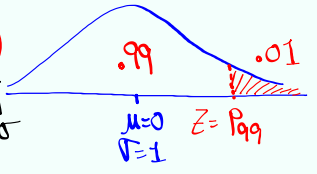
Find $Z = P_{99}$ Round to 3-decimal places.

99% below → 1% above

left Area .99 Right Area .01

Z = invNorm (.99, 0, 1)

Left Area, μ, σ



≈ 2.326

Oct 24-9:45 AM